# 2015 Pipeline Performance Summary

BC Oil and Gas Commission

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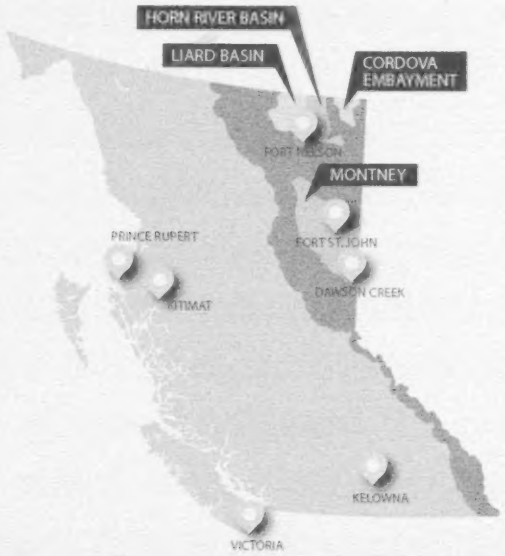
## About the BC Oil and Gas Commission

The BC Oil and Gas Commission (Commission) is the provincial regulatory agency with responsibilities for regulating oil and gas activities in British Columbia, including exploration, development, pipeline transportation and reclamation.

The Commission's core services include reviewing and assessing applications for industry activity, consulting with First Nations, cooperating with partner agencies, and ensuring industry complies with provincial legislation and all regulatory requirements. The public interest is protected by ensuring public safety, respecting those affected by oil and gas activities, conserving the environment, and ensuring equitable participation in production.

For general information about the Commission, please visit www.bcogc.ca or phone 250-794-5200.




### MISSION

We regulate oil and gas activities for the benefit of British Columbians.

We achieve this by:

- Protecting public safety,
- Respecting those affected by oil and gas activities,
- Conserving the environment, and
- Supporting resource development.

Through the active engagement of our stakeholders and partners, we provide fair and timely decisions within our regulatory framework.

We support opportunities for employee growth, recognize individual and group contributions, demonstrate accountability at all levels, and instill pride and confidence in our organization.

We serve with a passion for excellence.

### VISION

To provide oil and gas regulatory excellence for British Columbia's changing energy future.

### VALUES

Respectful

Accountable

Effective

Efficient

Responsive

Transparent

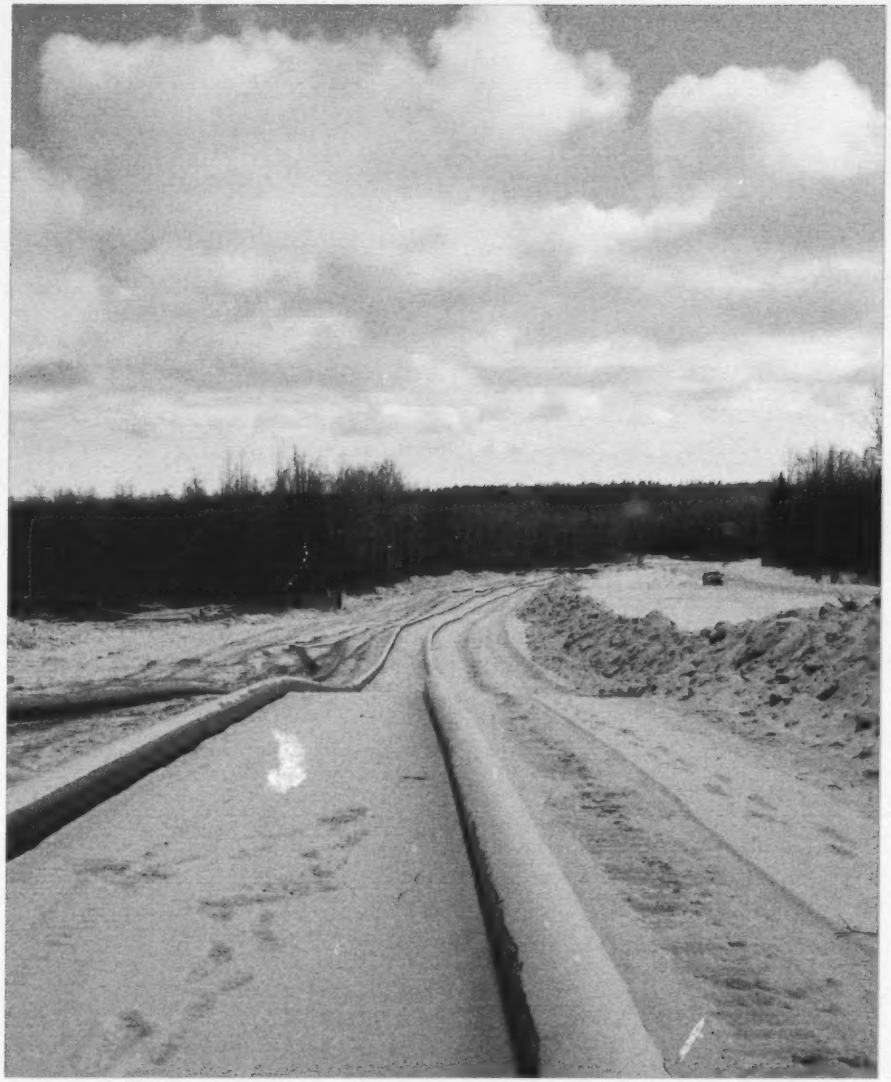
## Purpose

Pipelines are recognized as a safe and economical mode of transportation, and secure operation is essential to protecting public safety and the environment. British Columbia's oil and gas industry depends on pipelines for the distribution of products such as natural gas, water and oil.

The Commission regulates more than 43,000 kilometres of pipelines in the province. Eighty per cent of these pipelines transport natural gas, while less than six per cent carry oil. The remainder carry water or other gases or liquids.

This report provides a statistical overview of pipelines regulated by the Commission in the 2015 calendar year. It includes data on types of pipelines, lengths, uses and overall incident rates. It also summarizes the Integrity Management Program, which ensures operators test and maintain pipelines to mitigate potential integrity issues.

Forty-five incidents occurred on pipelines regulated by the Commission in 2015. However, not all led to the release of a product. The Commission ensures the pipeline is fixed before going back into operation, and the site has been completely remediated if there was a release.



## Pipeline Regulation

The Commission's jurisdiction extends to the majority of pipelines in British Columbia, as defined in legislation by the Oil and Gas Activities Act (OGAA). Activities regulated by the Commission extend throughout the lifecycle of a pipeline, and include permitting, construction, operation, maintenance and abandonment. Pipelines not under the Commission's jurisdiction, which include those crossing provincial and/or national borders and gas utility pipelines, are not addressed in this report.

Pipelines are regulated under the Pipeline Regulation, which states they must be operated and maintained in accordance with CSA Z662 – Oil and Gas Pipeline Systems. CSA Z662 is a national standard developed and maintained by the Canadian Standards Association (CSA) and covers the design, construction, operation and maintenance of oil and gas industry pipeline systems. It is required under OGAA that operators meet this CSA standard. Other applicable regulations include the Environmental Protection and Management Regulation, Consultation and Notification Regulation, Pipeline Crossings Regulation, and Emergency Management Regulation.

### Pipelines Defined

Pipelines regulated by the Commission are defined by legislation in OGAA. "Pipeline" refers to, except in Section 9 of OGAA, piping through which any of the following are transported:

- Petroleum or natural gas.
- Water produced in relation to the production of petroleum or natural gas, or conveyed to or from a facility for disposal into a pool or storage reservoir.
- Solids.
- Substances prescribed under Section 133(2)(v) of the Petroleum and Natural Gas Act.
- Other prescribed substances.

The scope of the definition also includes installations and facilities associated with the piping, but does not include:

- Piping used to transmit natural gas at less than 700 kilopascals (kPa) to consumers by a gas utility as defined in the Gas Utility Act.
- A well head.
- Anything else that is prescribed.

## Pipeline Inventory

The Commission regulates 43,584 kilometres (km) of pipelines in British Columbia. Pipelines transport a number of refined and unrefined products including natural gas, sour natural gas, crude oil, water, high-vapour pressure (HVP) hydrocarbons and other miscellaneous gases and oil effluent.

As shown in Table 1 (page 6) a net addition of 903 km of total registered pipelines went into operation or were reactivated in 2015. The most significant shift in status was the deactivation of 2,889 km of pipeline, an increase from the 1,776 km of pipeline deactivated in 2014. These deactivations contributed to the decrease of operating pipelines in 2015 over 2014.

### Classifications of Pipelines

**Abandoned**
Pipelines removed from service and not maintained for a later return to service.

**Deactivated**
Pipelines removed from service but maintained for a later return to service.

**Operating**
Pipelines actively used for the transport of fluids related to oil and gas operations, and piping that has been suspended from service for less than 18 months but not formally deactivated.

### Classifications of Products

**Sour Natural Gas** – natural gas with a hydrogen sulphide ($H_2S$) partial pressure greater than 0.3 kilopascals.

**Natural Gas** – natural gas, sweet gas and fuel gas.

**Crude Oil** – crude oil, sour crude and low-vapour-pressure hydrocarbons.

**Water** – freshwater, produced water, saltwater and sour water.

**High-Vapour Pressure (HVP)** – ethylene, propane, pentanes and liquid ethane.

**Other** – miscellaneous gases and liquids, condensate and oil emulsion/effluent.

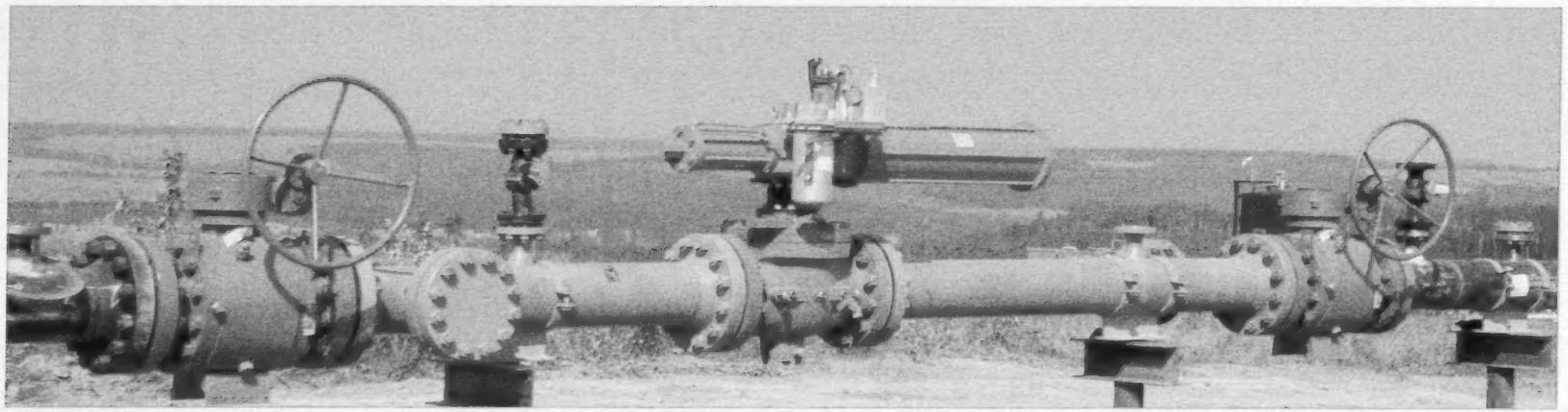


Table 1: Total lengths of pipelines by type and status (in kilometres)

| | 2014 | | | | 2015 | | | |
|---|---|---|---|---|---|---|---|---|
| **Type** | **Total** | **Operating** | **Deactivated** | **Abandoned** | **Total** | **Operating** | **Deactivated** | **Abandoned** |
| Natural Gas | 20,865 | 19,564 | 703 | 598 | 21,117 | 19,503 | 959 | 655 |
| Sour Natural Gas | 13,739 | 12,715 | 763 | 261 | 13,997 | 12,440 | 1,240 | 317 |
| Water | 3,205 | 3,000 | 61 | 144 | 3,450 | 3,146 | 138 | 166 |
| Crude Oil | 2,336 | 2,073 | 168 | 95 | 2,489 | 2,077 | 308 | 104 |
| Other | 2,178 | 1,927 | 71 | 180 | 2,144 | 1,821 | 231 | 92 |
| HVP | 358 | 302 | 10 | 46 | 387 | 328 | 13 | 46 |
| **Total** | **42,681** | **39,581** | **1,776** | **1,324** | **43,584** | **39,315** | **2,889** | **1,380** |

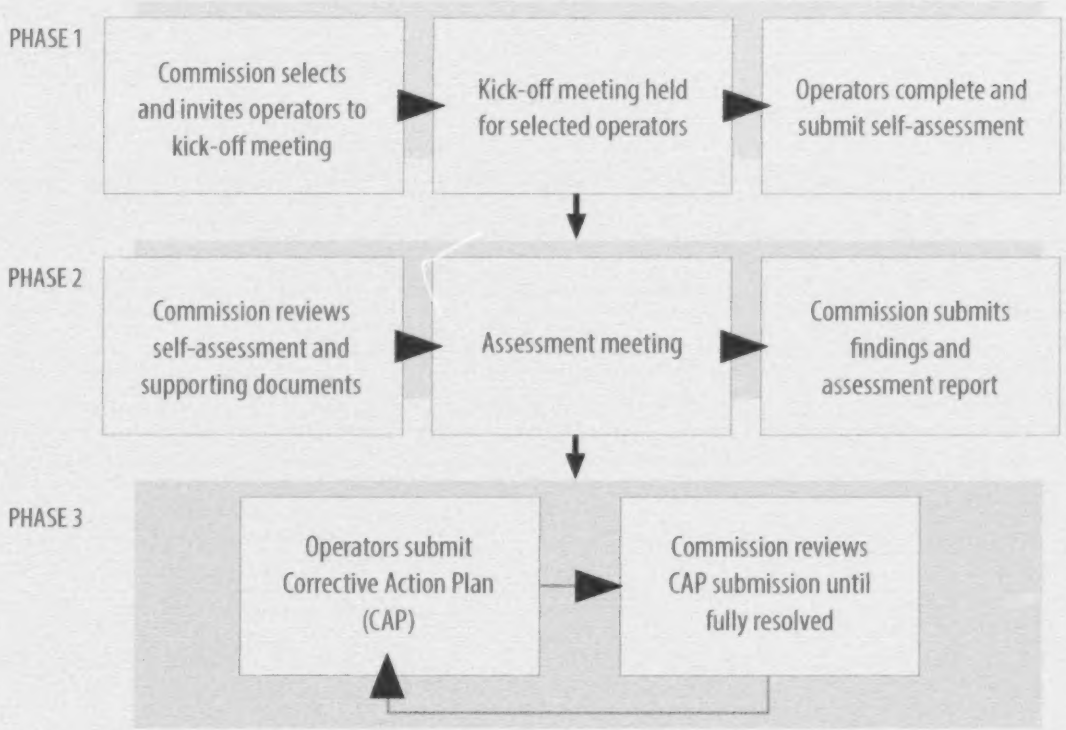
# Compliance Assessments of Integrity Management Program - Update for 2015

Pipeline Integrity Management Programs (IMPs) are documented programs specifying the processes and practices used by pipeline operators to ensure public safety, environmental protection, and operational reliability. The IMP programs incorporate a management system approach.

As per the B.C. Pipeline Regulation (PR), Section 7, every pipeline permit holder planning, designing, constructing, operating, maintaining or abandoning pipeline infrastructure within the Province of British Columbia must have developed and implemented IMPs.

The Commission has been assessing the effectiveness of permit holders' IMP programs since 2011. The Commission's pipeline IMP compliance assurance process consists of three phases; self-assessment, an assessment meeting, and corrective action plans and follow ups (Figure 1). Details of the compliance assurance process and the scope of the protocol can be viewed on the Commission website.

Figure 1: Compliance Assurance Process - Pipeline Integrity Management Program


PHASE 1
Commission selects and invites operators to kick-off meeting
Kick-off meeting held for selected operators
Operators complete and submit self-assessment
PHASE 2
Commission reviews self-assessment and supporting documents
Assessment meeting
Commission submits findings and assessment report
PHASE 3
Operators submit Corrective Action Plan (CAP)
Commission reviews CAP submission until fully resolved

During 2015, the Commission assessed the IMP programs of 19 pipeline operators. Where non-compliances were identified, operators were required to develop and implement corrective actions to rectify the deficiencies. The Commission monitors and assesses all corrective actions to ensure all non-compliance is fully resolved.

## Pipeline Emergency Requirements

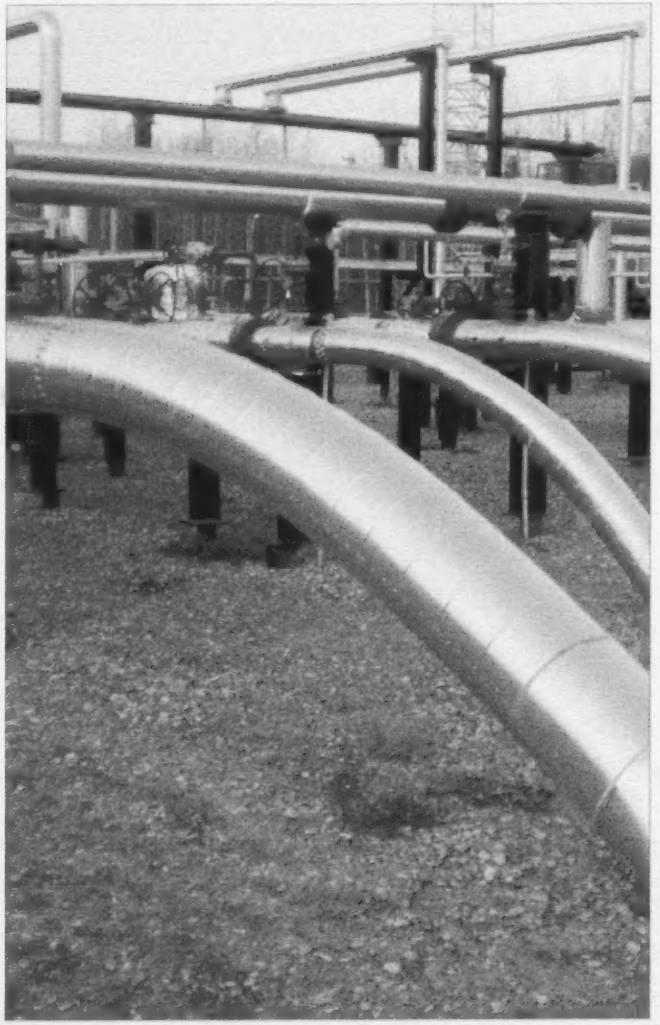
Section 37 of OGAA states an operator or person carrying out an oil and gas activity must prevent spillage and promptly report any damage or malfunction that could cause spillage to the Commission. Section 38 contains a provision whereby the permit holder must prepare and maintain an emergency response program and response contingency plan approved by the Commission.

If spillage occurs, the following actions must be taken:

- Remedy the cause or source of the spillage.
- Contain and eliminate the spillage.
- Remediate any land or body of water affected by the spillage.
- Report the location and severity of the spillage and any damage or malfunction to the Commission.

A person aware that spillage is occurring, or may occur, must take reasonable efforts to assist in containing or preventing the spillage. Assistance can be provided by calling the operating company indicated on signs identifying the location of the pipeline, or by calling the Commission's 24/7 emergency phone line. Depending on the level of the incident, the Commission may respond with trained personnel to ensure any risks are mitigated.

Permit holders must prepare and maintain emergency response programs and response contingency plans and update them annually. The Commission regularly audits these programs and may also oversee emergency exercises. Failure to satisfactorily meet these requirements can result in compliance and enforcement actions, which may include fines or shutting-in a pipeline system.



## Pipeline Incidents

In 2015 there were 45 incidents on pipelines regulated by the Commission[1]. Table 2 shows an overall incident frequency of 1.03 for every 1,000 km of pipelines, a slight increase from 0.98 in 2014.

Not all pipeline incidents result in spills. In 2010 the implementation of OGAA led to broader reporting criteria, meaning all incidents – including those that have the potential to affect the integrity of a pipeline but did not cause spillage – must be reported.

All incidents are responded to by the Commission and assessed to determine what remedial actions must be taken and whether the pipeline can continue to operate. If required, the Commission will issue orders to the permit holder for remedial actions. A permit holder must submit a post-incident report summarizing the root cause of the incident, repair methods, operational changes and design changes that may be required.

The Commission then conducts an investigation to determine the causes and contributing factors, and any remedial actions and/or repairs are identified in order to prevent a recurrence. Based on the results of these investigations, the Commission may issue recommendations to industry as a whole.

Table 2: Total number of incidents per 1,000 km of pipeline inventory

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| Length of Pipelines (km) | 40,125 | 40,392 | 42,681 | 43,584 |
| Number of Incidents | 27 | 38 | 42 | 45 |
| Incident Frequency (Incidents/1,000 km) | 0.67 | 0.94 | 0.98 | 1.03 |

1 These incidents apply only to events on operating pipelines. Incidents that occur prior to a line going active (such as during construction or pressure testing) have not been included. There were 29 incidents related to construction in 2015.

## Releases and Spills

In terms of incidents that involved a release or spill, Table 3 shows sour natural gas pipelines had the lowest incident rate with a frequency of 0.14 per 1,000 kilometres. Pipelines classified as 'HVP' had the highest incident frequency at 15.50, crude oil had the second highest number of incidents at 2.81.

In the event of a pipeline gas release or liquid spill, the Commission ensures it is completely cleaned up and remediated by the company, and that all problems are fixed before operations resume. An investigation takes place into every incident to help ensure it does not happen again.

The largest gas release from a pipeline in 2015 was a 199,000 $m^3$ release of dry, sweet gas at a remote location within the Dilly Field outside of Fort Nelson. The cause of failure was underdeposit corrosion. The pipeline was shut-in upon detection of the leak and has been deactivated.

The largest liquid spill from a pipeline in 2015 was 900 L of produced water in the Altares Field. The operator enacted its emergency response plan and shut-in the pipeline. The cause of failure was found to be a leaking flange at a pipeline junction. The spill was cleaned up using vacuum trucks 10 minutes after incident discovery. The connection was replaced with a more robust compression fitting.

Table 3: Total number of incidents with release per 1,000 km by type of pipeline in 2015

| Type of Pipeline | Length of Pipeline (km) | # of Incidents | Frequency (per 1,000 km) |
|---|---|---|---|
| Natural Gas | 21,117 | 10 | 0.47 |
| Sour Natural Gas | 13,997 | 2 | 0.14 |
| Water | 3,450 | 3 | 0.87 |
| Crude Oil | 2,489 | 7 | 2.81 |
| Other | 2,144 | 3 | 1.40 |
| HVP | 387 | 6 | 15.50 |

## Incident Causes

Table 4 shows metal loss was the leading cause of pipeline failures in 2015, contributing to 25 incidents. External interference was the second leading cause of failures contributing to seven incidents.

Table 4: Classification of Pipeline Failures

| Incident Cause | Definition | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|
| Metal loss | Wall thickness reduction (due to corrosion, for example) | | | | |
| **Total** | | **12** | **22** | **21** | **25** |
| Pipeline/equipment failure | Failure of pipeline and/or equipment | | | | |
| Cracking in pipe | Mechanically driven or environmentally assisted cracking of the pipe | 1 | 0 | 3 | 0 |
| Pipe fittings/join failure | Failure in valve, weld, flange, etc. | 4 | 4 | 0 | 1 |
| Miscellaneous equipment | Failure in the tank, compressor, site seeing glass, etc. | 1 | 0 | 0 | 4 |
| **Total** | | **6** | **4** | **3** | **5** |
| External Interference | External activities causing damage to pipe | | | | |
| Third party interference | Interference by someone other than operating company or its employees/contractors | 2 | 5 | 1 | 3 |
| Company | Interference by operating company or its employees/ contractors | 1 | 4 | 8 | 4 |
| Vandalism | Interference caused willfully | 0 | 0 | 0 | 0 |
| **Total** | | **3** | **9** | **9** | **7** |
| Material Manufacturing or Construction | Defects in the fitting, construction or components | **0** | **2** | **1** | **1** |
| Geotechnical Failure | Loss of integrity due to geotechnical effect | **4** | **1** | **8** | **2** |
| Other Causes | Other causes not included in previous definitions | | | | |
| Improper Operation | Decision error made by operating company during service | 2 | 0 | 0 | 5 |
| Overpressure | Failure caused due to overpressure of pipe | 0 | 0 | 0 | 0 |
| **Total** | | **2** | **0** | **0** | **0** |
| **Total Incidents** | | **27** | **38** | **42** | **45** |

## Moving Forward

The Commission is undertaking IMP compliance assessments for all B.C. pipeline operators, while continuing to engage with companies to improve the design, construction, operation and maintenance of pipelines, including older, legacy pipes.

The Commission recognizes the need for communication and transparency in regard to its role as B.C.'s regulator of oil and gas activities and protecting public safety. Efforts will continue to enhance information and knowledge sharing between the Commission, public, stakeholders, engineers and experts.

More Information

## Contact www.bcogc.ca

This summary was published in June 2016 and is updated annually. Previous pipeline performance summaries can be found here. For specific questions regarding this document please contact OGC.Communications@bcogc.ca.